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Exploring How Knowledge of Hepatitis B Influences Pregnant Women's Preventive Attitudes toward Vertical Transmission

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ABSTRACT

Background: Pregnant women infected with Hepatitis B face the risk of vertical transmission, meaning the disease can pass from mother to child. Adequate care and knowledge of Hepatitis B among pregnant women are crucial to prevent this transmission.

Objective: This study aimed to examine the relationship between pregnant women's knowledge of Hepatitis B and their preventive attitudes toward vertical transmission in North Kuta, Bali.

Methods: A cross-sectional correlational study was conducted on 90 pregnant women screened for Hepatitis B at the North Kuta Health Center UPTD from February to March 2024. Consecutive sampling was used to select respondents. Data on Hepatitis B knowledge and preventive attitudes were collected using a validated questionnaire based on the WHO Protocol for MTCT. Analysis was performed using the Spearman-Rho test.

Results: Among the respondents, 55.6% demonstrated low knowledge of Hepatitis B, and 44.4% displayed inadequate preventive attitudes. A significant positive correlation was found between knowledge and preventive attitudes ($r = 0.229$, $p = 0.000$), indicating that higher knowledge levels were associated with better attitudes.

Conclusion: The study indicates that low knowledge and poor attitudes in pregnant women heighten the risk of Hepatitis B transmission to their children. Continuous education by healthcare providers is essential to foster positive preventive attitudes among pregnant women, thereby reducing mother-to-child transmission rates of Hepatitis B.

Keywords: knowledge level; preventive attitude; hepatitis B; pregnant women.

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INTRODUCTION

Hepatitis is an inflammation of liver cells caused by a variety of factors, including infections (viruses, bacteria, parasites), medications (including traditional medicine), alcohol consumption, excess fat, and autoimmune diseases. Types of viruses that can cause hepatitis include Hepatitis A (HAV), Hepatitis B (HBV), Hepatitis C (HCV), Hepatitis D (HDV), and Hepatitis E (HEV) (Adeyemi et al., 2013). According to the World Health Organization (WHO), Hepatitis B is a major global health problem, with the highest prevalence of chronic infections in sub-Saharan Africa and East Asia, where 5-10% of the adult population is chronically infected. High rates of chronic infection are also found in the Amazon region and southern parts of Eastern and Central Europe, while in the Middle East and the India Subcontinent, it is estimated that 2-5% of the general population is chronically infected. In Western Europe and North America, the prevalence of chronic infections is less than 1% (Dwiartama et al., 2022).

Hepatitis B transmission can occur in two main ways: vertical and horizontal. Vertical transmission occurs from a mother who is positive for Hepatitis B to her baby during childbirth, while horizontal transmission can occur through body fluids and blood products, such as saliva, cerebrospinal fluid, peritoneal fluid, pleural fluid, amniotic fluid, semen, vaginal fluid, and other body fluids. Horizontal transmission can also occur through the use of non-sterile syringes, such as in tattoo procedures (Nguyen et al., 2020). In pregnancy, the risk of HBV infection is the same as that of non-pregnant women of the same age, but HBV infection in pregnant women can increase the risk of abortion, premature labor, and bleeding (Widiyanti Surya Atmaja & Lisnawati, 2022). Babies infected with HBV have a 90% chance of developing chronic Hepatitis B, which can lead to cirrhosis of hepatis and liver cancer (Nokhodian et al., 2014).

The WHO states that *Mother To Child Transmission* (MTCT) is the main mode of transmission of HBV worldwide. Although there has been an increase in the administration of HBV vaccine to infants worldwide, MTCT still accounts for about 50% of new HBV infection cases. The national program in the prevention and control of Hepatitis B currently focuses on the Prevention of Mother-to-Child Transmission (PPIA), because 95% of Hepatitis B transmission occurs vertically (Kemenkes RI, 2008 ; 2019). Pregnant women's concern and knowledge about Hepatitis B is very important to prevent the transmission of this disease. Since 2015, Hepatitis B Early Detection (DDHB) activities have been carried out in pregnant women in basic health services (Puskesmas) and their networks. Hepatitis B examination is carried out through a blood test with a Rapid Diagnostic Test (RDT) for Hepatitis B surface antigen (HBsAg) (Amsir et al., 2023). However, research in Nigeria shows that 76% of pregnant women have inadequate knowledge about HBV infection (Kemenkes RI, 2018).

Hang Pham et al. (2019) highlighted the importance of increasing awareness and knowledge of pregnant women about HBV to prevent MTCT. However, the lack of advocacy attitudes that support their children's health hinders the effectiveness of HBV prevention and treatment. PPHI underlines that mother-to-child transmission of HBV is one of the biggest threats, with about 3.9% of pregnant women in Indonesia as carriers of HBsAg, who are at high risk of transmitting the virus to their babies (Nokhodian et al., 2014). Children who are infected before the age of 6 have a high risk of developing chronic liver disease or liver cancer later in life (Ott et al., 2012).

Bali Province is ranked 10th out of 34 provinces in Indonesia with a positive HBsAg prevalence of 1.47% out of 32,489 pregnant women tested (Indonesia Health Profile, 2018). In Badung Regency, the number of pregnant women reactive to Hepatitis B is the second highest in Bali Province, with North Kuta District recording 18 cases (Hepatitis and Gastrointestinal Infectious Disease Information System, 2023). Despite national initiatives to reduce Hepatitis B transmission, such as the Hepatitis B Early Detection Program and maternal immunoprophylaxis guidelines, North Kuta faces unique challenges, including a high proportion of migrant populations (90%) and limited access to culturally tailored educational interventions. These factors contribute to gaps in knowledge and preventive attitudes among pregnant women, underscoring the urgency of localized research and intervention strategies.

Data from the UPTD of the North Kuta Health Center shows that 90% of the 20 pregnant women who are reactive to HBsAg in 2023 are migrants, while the other 10% are indigenous people (UPTD North Kuta Health Center, 2022). Although North Kuta, Bali, reported 18 cases of Hepatitis B among pregnant women in 2023, other regions in Indonesia showed significantly higher numbers. Across Bali, 610 pregnant women were found to be reactive for HBsAg (1.15%). At the same time, East Java reported 8,269 cases (1.76%), and DKI Jakarta recorded 1,379 cases (1.17%) during the same year (Report on Early Detection of Hepatitis B in Pregnant Women, 2022-2023). This highlights regional disparities in the prevalence of Hepatitis B, which are likely influenced by differences in access to healthcare services, program coverage, and socioeconomic conditions in each region.

The program to prevent HBV transmission from mother to child includes HBsAg examination in pregnant women and the administration of Hepatitis B (HbIg) immunoglobulin as well as vaccination of babies born to HBsAg-positive mothers. However, there are still some babies who do not get vaccinated on time or do not undergo a serological examination at the age of 9-12 months (Lisker-Melman et al., 2020). Awareness and access to information differ in each region affecting pregnant women's knowledge about Hepatitis B and its prevention. Therefore, it is important to carry out socialization and education to pregnant women to prevent transmission from mother to child. The North Kuta Health Center plays an important role in this effort, but there are still challenges in ensuring that all babies from HBsAg-positive mothers receive proper care.

Although the relationship between knowledge and preventive attitudes towards Hepatitis B has been explored globally, research examining this relationship in specific regions in Indonesia, including North Kuta and Bali, is still lacking. These research gaps limit the ability to design local interventions that address the unique challenges pregnant women face in this area. In addition, although many studies show that a lack of knowledge about HBV is associated with a high prevalence of infection, research on the knowledge and attitudes of

pregnant women is also still limited. The attitude of pregnant women towards MTCT prevention is critical because it can influence their willingness to carry out pregnancy checks and follow WHO immunoprophylaxis guidelines (Han et al., 2017). This study aims to determine the relationship between the knowledge of pregnant women about hepatitis B and the mother's attitude toward preventing the occurrence of Hepatitis B via Vertical Transmission (MTCT) in the UPTD area of the North Kuta Health Center.

METHODS

This study uses a quantitative approach with a cross-sectional correlational design to explore the relationship between pregnant women's knowledge about Hepatitis B and their attitudes in preventing vertical transmission. The study population includes pregnant women at the North Kuta Health Center UPTD, with a total of 90 people as a sample selected through consecutive sampling techniques based on inclusion and exclusion criteria. Data was collected over a period of one month, from February to March 2024, using a questionnaire consisting of two parts: knowledge and attitudes.

The questionnaire used in this study was developed by the World Health Organization (WHO) and has been tested for validity and reliability. The knowledge section includes 11 questions using the Gutman scale, while the attitude section consists of 5 questions on the Likert scale. Data collection was carried out ethically, with permission from KEPK College of Health Sciences Bina Usada Bali number: 064/EA/KEPK-BUB-2024 and informed consent from the respondents. The researcher ensured that the participants' participation was voluntary and that their data was kept confidential.

The collected data is analyzed using statistical software to identify relationships between the variables studied. The data analysis involved the use of linear regression techniques and Spearman correlation, with a significance level of $p < 0.05$. The results of this analysis are expected to provide insight into how pregnant women's knowledge about Hepatitis B can affect their attitudes in preventing vertical transmission, as well as provide recommendations for improving education and health interventions in related health centers.

RESULTS

Demographic data or characteristics of respondents in the study are as follows:

Table 1. Frequency Distribution of Respondent Characteristics (n=90)

Characteristic	Frequency (f)	Percentage (%)
Age (years)		
19 – 23	17	18.8
24 – 28	31	34.4
29 – 33	26	28.9
34 – 39	12	13.3
40 – 44	4	4.4
History of Hepatitis		
Have a previous history of hepatitis	8	8.9
Have no previous history of hepatitis	82	91.1
Number of children owned		
None	0	0
One child	29	32.2
More than one child	61	67.8
Education		
Elementary School	3	3.3
Junior High School	23	25.6
Senior Hight School	51	56.7
College/University	13	14.7

Based on Table 1, the frequency distribution of respondent characteristics shows that the most age group is 24–28 years old, with the number of respondents being 31 people (34.4%). This shows that the majority of respondents are at young reproductive age. In addition, in terms of history of hepatitis, most respondents (91.1%) had no previous history of hepatitis, with only 8 people (8.9%) reporting having such a history. Furthermore, based on the number of children owned, the majority of respondents (67.8%) had more than one child, while 32.2% of respondents had one child. None of the respondents did not have children. This shows that most of the pregnant women in this study already have experience in pregnancy and childbirth before. In terms of education, most respondents have a high school education (56.7%), followed by junior high school (25.6%), and higher education (PT) at 14.7%. Only 3.3% of respondents have an elementary education level. This distribution showed that the majority of respondents had a secondary education level, which could potentially affect their

understanding of health, including regarding hepatitis and its prevention.

Table 2. Distribution of Frequency of Knowledge and Attitudes of Respondents (n=90)

Variable	Frequency (f)	Percentage (%)
Knowledge		
Good	6	6.7
Enough	34	37.8
Low	50	55.6
Attitude		
Bad	40	44.4
Good	36	40.0
Excellent/ very good	14	15.6

Based on Table 2, the level of knowledge of respondents about Hepatitis B disease is mostly in the low category, with 50 respondents (55.6%). A total of 34 respondents (37.8%) had a sufficient level of knowledge, and only 6 respondents (6.7%) had good knowledge about this disease. This shows that there are still many respondents who need to improve their understanding of Hepatitis B. In terms of attitudes in preventing vertical transmission of MTCT Hepatitis B, as many as 40 respondents (44.4%) showed a bad attitude. Meanwhile, 36 respondents (40.0%) had a good attitude, and 14 respondents (15.6%) had a very good attitude. This data shows that although there are some respondents who have a good and very good attitude, there is a need to improve preventive attitudes among respondents who still have a bad attitude.

Table 3. Results of the Correlation Test of the Level of Knowledge of Pregnant Women Regarding Hepatitis B Disease to the Mother's Attitude in Preventing Hepatitis B Disease Through Vertical Transmission (MTCT)

Variable (N=90)	Attitude of Pregnant Women			Value	Correlation Coefficient
	Not Good (N=40)	Good (N=36)	Excellent (N=14)		
Knowledge					
Less	25 (50,0%)	18 (36,0%)	7 (14,0%)	0,000	0.229
Enough	13 (38,2%)	16 (47,1%)	5 (14,7%)		
Good	2 (33,3%)	2 (33,3%)	2 (33,3%)		
Total	**40 (44,4%)**	**36 (40,0%)**	**14 (15,6%)**		

Based on the table 3 above, as many as 50% of respondents with less knowledge have a bad attitude, 36% have a good attitude, and 14% have a very good attitude. Respondents with sufficient knowledge showed that 38.2% had a bad attitude, 47.1% had a good attitude, and 14.7% had a very good attitude. Meanwhile, respondents with good knowledge were divided equally: 33.3% had a bad, good, and very good attitude respectively. The Spearman-rho Test showed a significant relationship between maternal knowledge about Hepatitis B and maternal attitudes in preventing vertical transmission (MTCT) of Hepatitis B. The test results showed a significant value of p-value = 0.000 < α 0.05, so it can be concluded that there is a significant relationship between knowledge and attitude. The correlation coefficient of 0.229 indicates a weak but positive relationship, meaning that the higher the knowledge, the better the mother's attitude in preventing the transmission of Hepatitis B through MTCT in the UPTD area of the North Kuta Health Center.

DISCUSSION

Based on the findings, the majority of respondents were within the age range of early adulthood, which corresponds with a higher susceptibility to Hepatitis B infection, as supported by similar studies in Hong Kong and Malang. This phase of life often involves a series of biological, social, and economic changes that can influence health-seeking behavior and risk exposure. Factors such as increased social interaction and reproductive health activities could contribute to this age group's heightened risk profile. Research by (Sagnelli et al., 2021) similarly found that younger adult women exhibit higher rates of Hepatitis B due to lifestyle and reproductive factors.

In terms of Hepatitis B history, most respondents had no prior infection, yet a considerable number were mothers with multiple pregnancies (multiparous). Studies indicate that higher parity is associated with an increased risk of Hepatitis B due to various contributing factors, such as cumulative exposure to medical interventions, sexual exposure,

and potentially limited access to preventive education or vaccination. These findings align with research by (Iannacone & Guidotti, 2022) and (Liaw & Chu, 2009), which suggest that each successive pregnancy may increase exposure risks, emphasizing the need for tailored health interventions targeting multiparous women.

Education level emerged as another key factor, with high school education being the predominant background among respondents. This level of education is often linked to limited access to advanced health information, which may impact health literacy and awareness about preventive measures for diseases like Hepatitis B. According to (Antuamwine et al., 2022), limited education is a socioeconomic risk factor for Hepatitis B, potentially due to reduced understanding of health risks and preventive measures. Research by Alemu et al., (2020) also supports the notion that women with lower educational attainment are more likely to lack essential knowledge about Hepatitis B, increasing their vulnerability to infection.

The study further reveals that a significant number of respondents demonstrated low knowledge levels about Hepatitis B. This lack of knowledge is likely linked to their educational background and early adult age group. As Notoadmodjo (2010) in Gunardi et al., 2014) noted, knowledge acquisition is influenced by factors such as education, information access, and age. Younger adults with limited education may not have sufficient exposure to comprehensive health information, potentially affecting their understanding of Hepatitis B risks and prevention. Furthermore, (Antuamwine et al., 2022) argue that education and age are interrelated factors that shape respondents' knowledge of Hepatitis B, with higher education levels and older age associated with better disease understanding.

When examining the attitudes of pregnant women towards preventing vertical transmission of Hepatitis B (MTCT), it was observed that a concerning number of respondents had poor attitudes regarding prevention. This poor attitude appears to be associated with a lack of knowledge about critical preventive measures, such as the use of Hepatitis B immunoglobulin (HbIg) for newborns and the importance of serological screening. This lack of awareness hinders mothers from taking essential steps in preventing mother-to-child transmission. Similar findings were reported by (Sagnelli et al., 2021), which identified low levels of awareness about Hepatitis B screening and vaccination across different populations, suggesting that the problem is not isolated but may be part of a larger pattern of limited awareness globally.

The Spearman-rho test in this study highlighted a significant association between the level of knowledge and attitudes towards preventing Hepatitis B vertical transmission, suggesting that knowledge enhancement may positively influence preventive attitudes. This result emphasizes the role of health literacy in shaping attitudes and actions among pregnant women, as those with better disease knowledge were found to adopt more proactive prevention strategies. This finding aligns with (Lisker-Melman et al., 2020), who highlighted that poor awareness and understanding of Hepatitis B vaccines and screening can directly affect maternal attitudes, leading to ineffective preventive measures.

To address these findings, enhancing the knowledge of pregnant women about Hepatitis B and its preventive measures is essential. This could be achieved through structured health education programs, tailored informational materials, and frequent counseling by healthcare providers during prenatal visits. By increasing awareness and understanding of Hepatitis B and the preventive measures, such as vaccination and screening, healthcare professionals can foster a more positive preventive attitude among pregnant women, thereby helping reduce the risk of mother-to-child.

Implications

The findings of this study underscore the critical importance of improving maternal knowledge about Hepatitis B to foster positive attitudes toward its prevention, particularly in the context of vertical transmission. This has significant implications for public health programs targeting pregnant women in North Kuta and similar regions. Educational interventions tailored to the demographic characteristics of the population—such as age, educational background, and parity—are essential to ensure effective knowledge dissemination and behavior modification. Moreover, integrating comprehensive Hepatitis B education into routine prenatal care could strengthen health literacy and promote proactive preventive behaviors among mothers, ultimately reducing the risk of mother-to-child transmission (MTCT). These implications highlight the need for culturally and contextually relevant health promotion strategies to bridge gaps in knowledge and improve maternal and child health outcomes.

Limitations and Recommendations

This study has several limitations that should be considered when interpreting the findings. First, the use of consecutive sampling may limit the generalizability of the results to other populations beyond the study area in North Kuta. Second, the reliance on self-reported data through questionnaires introduces the possibility of response bias, as participants may have provided socially desirable answers. Third, the study focused primarily on quantitative data, which may not capture the nuanced

experiences and perceptions of respondents regarding Hepatitis B prevention. Lastly, the weak positive correlation observed between knowledge and attitudes suggests that other unexamined factors, such as cultural beliefs, access to healthcare, or social support, may also play a role in shaping maternal attitudes.

To address these limitations and enhance the impact of future research, several recommendations are proposed. First, future studies should consider employing probability sampling techniques to increase the generalizability of findings and ensure representation of diverse populations. Second, incorporating qualitative methods, such as in-depth interviews or focus group discussions, could provide richer insights into the barriers and facilitators of maternal knowledge and attitudes. Third, future research should explore additional factors influencing attitudes, such as cultural beliefs, health system accessibility, and social determinants of health. In terms of practical applications, healthcare providers should prioritize the integration of tailored educational programs into prenatal care services, focusing on delivering accurate and culturally appropriate information about Hepatitis B prevention. Community-based interventions, including workshops and campaigns, can further enhance awareness and facilitate proactive engagement among pregnant women.

CONCLUSIONS

The study found that most respondents were young adults (24-28 years old) with no prior history of Hepatitis B, primarily multiparous, and possessing high school education as their highest level. The overall low knowledge about Hepatitis B among respondents was linked to a poor attitude toward preventing mother-to-child transmission (MTCT), while those with moderate to high knowledge demonstrated better preventive attitudes. These findings emphasize the need for continuous health education by nurses to improve understanding and encourage effective prevention practices. Raising public awareness about Hepatitis B, particularly among pregnant women, is critical to enhancing personal and infant health. Educational institutions should incorporate targeted health literacy strategies, while the nursing field should prioritize ongoing education and monitoring of infants born to mothers with Hepatitis B, supporting improved long-term health outcomes.

Declaration of Interest

The author states that there is no conflict of interest regarding the publication of this paper. The author has no financial interest or other interest in the products or distributors mentioned in this study. No association, such as consulting, shareholding, or other equity interests or patent licensing arrangements, to disclose

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Authors' Contributions

All authors contributed substantially to the conceptualization, design, data curation, formal analysis, interpretation, writing, review, and editing of the paper. All authors approve the final version to be published.

Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

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